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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE • JUNE 9, 1945

Timid Sparrow

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PUBLIC HEALTH

Overlooked Disease Cause

Rats may spread polio. At least 93 persons bitten in four years within an area of two square miles in Baltimore. Rats have a craving for human blood.

➤ PHYSICAL contact between rats and human beings may be a way, heretofore overlooked, in which such diseases as poliomyelitis and rabies are transmitted, Dr. Curt P. Richter of the Johns Hopkins Hospital, Baltimore, reports. (*Journal, American Medical Association,* June 2.) Dr. Richter calls attention to the large number of people who have been bitten by rats and the probably much higher incidence of actual physical contact.

At least 93 persons were bitten by rats during the four years from 1939 to 1943 within an area of less than two square miles in the city of Baltimore, Md. The Johns Hopkins Hospital, located within this area, treated 65 of these cases. Although 10.7% of them developed rat bite fever, none died as a result.

The age of the patients ranged from two months to 65 years, most of them (60%) being babies under one year of age. Persons were more apt to be bitten in heavily infested districts with poor housing and living conditions.

All of the people were bitten at night, the hands and face being most frequently bitten as they are exposed during sleep. In many cases the bites did little more than puncture the skin and draw blood before the patients were awakened. In some instances, however, part of the face was chewed away before the rat was driven off.

Once having bitten a human being, Dr. Richter points out, the rats are apt to bite others. In one house four children and two adults were bitten within a short time. The first bite usually awakens the victim, however, and the rat is frightened away.

Rats have a real craving for fresh human blood, Dr. Richter's experiments showed. The human blood used to feed the rats was obtained from the hospital operating room. Whereas the average normal food intake of full-grown wild rats does not usually exceed 35 to 40 grams, 139 grams of fresh blood mixed with 8% citrate were consumed within less than 24 hours by two of the eight common Norway rats trapped in the city alleys and yards.

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GENERAL SCIENCE

Hope of More Meat

An anti-fatigue chemical, and new ways to control cancer and mental disease also seen in researches at new scientific foundation.

➤ HOPE of increased meat production, an anti-fatigue chemical, and new light on the problems of cancer, mental disease and aging, may come from researches going on at a new scientific institution dedicated in Worcester, Mass., on June 9.

It is the Worcester Foundation for Experimental Biology, non-profit and educational institution supported in part by the community of Worcester and Worcester County and in part by grants from philanthropic foundations, industry, government agencies and private individuals.

Director of the new institution is Dr. Hudson Hoagland. Dr. Gregory Pincus is director of the Foundation's laboratories at nearby Shrewsbury, Mass. Officers of the Foundation are: President, Dr. Harlow Shapley, director of the Harvard College Observatory, Cambridge, Mass.; Vice president, Rabbi Levi A. Olan, Worcester, Mass.; Secretary, Dr. Roy G. Hoskins, director, Memorial Foundation for Neuroendocrine Research, Harvard Medical School; Treasurer, Dwight E. Priest, president, Parker Manufacturing Co.; Assistant Treasurer, John Z. Buckley, treasurer, Parker Manufacturing Co.

More steak and chops will not be available this summer as a result of the Foundation studies. The experiments have not yet reached so close to practical application. They illustrate, however, one of the tenets of the Foundation, that the same sort of advances in health, nutrition and medicine will come from fundamental research in biology as the great advancements in modern engineering which were based on understanding and application of basic physical and chemical principles.

The physiology of the development of mammalian eggs and embryos and the regulation of reproduction by hormones have long been studied by some of the personnel of the Foundation's staff, Dr. Hoagland stated. They are continuing this work in the direction of attempting to produce multiple young per birth in domestic animals—experiments which if successful would make possible substantial increase in the world's meat yield.

Hormones, the chemicals produced by the endocrine glands of the body, are being extensively studied in other aspects of their effects on living beings.

In a study of mental patients, coordinated changes in electrical brain wave activity and hormone reactions have been found to accompany changing psychiatric reactions in the patients.

Possibility that the acute fatigue suffered by patients with certain types of mental and emotional disorders may have a glandular basis is suggested by another series of investigations of hormone physiology.

This work started with the finding by the Worcester group that excretion via the kidneys of certain types of hormones, or chemicals derived from them, is different in persons suffering from cancer.

Later the Worcester group found that excretion of these chemicals which are derived from adrenal gland hormones, is greater in men who suffer most from fatigue when working under stress. This showed that the ability of men to withstand fatiguing ordeals is related to the functioning of the adrenal gland cortex.

The Worcester scientists next searched for a way to offset this. They found it in a synthetic chemical, pregnenolone. Daily doses of this resulted in improved target meter performance by healthy young men working under simulated flying conditions and improvement in production rates and waste savings by factory workers in operations involving incentive piece work pay.

Finally, scientists at the Foundation are slowly accumulating information about hormone action as a function of age which may help to prolong man's useful years.

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GEOPHYSICS

Paricutin Is Laboratory

Quantities of buried vegetation are being studied as "fossils in the making" because of the possible similarity between them and ancient fossils.

➤ PARICUTIN, the world's youngest volcano, has already been put to work in the interests of science. This fiery infant, that sprang from the soil of Mexico only a couple of years ago, has buried quantities of vegetation under the thick showers of ash it has spewed up. Because of the possible similarity between the burial of these plants and that of leaves and stems millions of years old, now found as fossils in the western United States, Prof. Erling Dorf of Harvard University has been closely studying these "fossils in the making." He reported on his preliminary findings at the meeting of the American Geophysical Union in Washington, D. C.

True fossilization, which implies mineral impregnation of the wood, has hardly begun, Prof. Dorf stated. Not all plant materials fossilize equally well, so some plants will be preserved and others will vanish.

In general, plant remains were well preserved only if buried close to their parent trees and shrubs. Preservation was better where ashes showered out of the air than where leaves were embedded in mud formed from the ash under water. Offsetting this, however, is the greater likelihood of the first kind of burials being subsequently destroyed by erosion.

Greatest likelihood of complete fossilization and subsequent preservation, Prof. Dorf thinks, will be in ash deposits subsequently covered and sealed under by flows of lava.

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Dam Causes Earthquakes

➤ SMALL local earthquakes in the neighborhood of Boulder Dam have apparently been caused by the pile-up of water in the great artificial lake thus created. No harm to the dam or its auxiliary installations is anticipated, however, Dr. Dean S. Carder, seismologist of the U. S. Coast and Geodetic Survey, who has been making a five-year study on the spot for the U. S. Reclamation Service, reassured his colleagues at the meeting.

Great care was exercised, in selecting the damsite, to locate it on the most stable geologic formations available, and to avoid all known active faults. Really active seismic regions in Nevada are well to the north, and the parts of California where major earthquakes have occurred are far to the west and southwest.

It was only to be expected, however, that the loading of a great mass of water into a hitherto empty canyon system would cause some slight earth movements. Total weight of water in Lake Mead, when it is full to spillway height, is approximately 40 billion tons. Withdrawals for power, irrigation, and city water supplies may reduce that by as much as eight or ten billion tons in a year. Low point usually comes in April, high water in July. The little quakes which Dr. Carder has been studying are most frequent when the lake is full.

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Storms Shake Land

➤ THERE is literal truth in the poets' old declarations that great storms at sea make even the firm earth shake. A scientific, quantitative study of the correlation between sea storms and the almost imperceptible trembling of land masses known as microseisms was presented before the meeting by Leonard M. Murphy of the U. S. Coast and Geodetic Survey. Records of microseisms made at 13 stations in the United States, Alaska and Greenland, for three successive October-to-March seasons, indicated that the bigger and more intense the storm area the more marked was the earth trembling detected by the instruments, even far inland, Mr. Murphy told his audience. Storms off Newfoundland that recorded their passing on instruments in the United States failed to show up on the records of instruments in Greenland, and conversely, great storms off the Greenland coast did not register on the microseismometers in the United States.

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PHYSICS

Japanese Oxygen Mask Generates Its Own Oxygen

➤ A STRANGE type of oxygen mask that generates its own oxygen by electricity is part of the standard equipment of the Mikado's troops. Translations of instruction plates from an oxygen mask forwarded to the Air Technical Service Command at Wright Field reveal how the unique device works. Oxygen masks

VARY IN SIZE—These .30 caliber cartridges, pictured by the Western Cartridge Company, have only one thing in common: the diameter of all the bullets is exactly .30 inch. Everything else differs—weights of bullet and powder, length and shape of powder chamber, type of jacketing or no jacket at all. Each fits a different type of firearm. From left to right: cartridges for the Army's new carbine, Remington, Winchester and Savage sporting rifles, the Krag-Jorgensen rifle of Spanish-American War fame and the present-day M-1 (Garand) rifle.

used by American troops and flyers in high-altitude B-29 Superfortresses and other planes use compressed oxygen prepared at mobile oxygen-generating plants and stored in metal cylinders until needed.

One of the Japanese systems consists of six units, a battery, two electric buttons, a container for the oxygen generator, a gas meter, the mask and rubber tubing connecting the generator, meter and mask. Two special chemical oxygen generators are inserted in the container, which is fitted with a metal door opening at the top. When ready for use, one of the electric buttons is pressed down, igniting the generator. Oxygen begins to flow in five seconds. After generation has once started it does not stop for 75 minutes. By using both generators, enough oxygen to last a man for two hours is produced. The meter tells the Nip fighter how much oxygen he is getting.

The Japanese also use the compressed gas system, and the chemical system may be used as an auxiliary.

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PHYSIOLOGY

Youth Can't Be Kept

Searchers for the fountain of youth in pills from the drug store are doomed to disappointment. Aging process involves more than decline in "sex hormones."

By DR. EARL T. ENGLE

Professor of Anatomy, Columbia University College of Physicians and Surgeons

▶ WHEN people reach middle age they begin to be fearful of growing old. They have no faith in the famous lines from Browning, "Grow old along with me! The best is yet to be," but make a frantic effort to regain their vanished youthfulness.

The magic in the words vitamins or hormones is attractive to many of this great group of our people. The advertising agencies and the facile and uninformed journalists do much to keep before the public the hopes that youth need not be lost, or once vanished, that it may quickly be restored.

At the present moment the so-called "sex hormones" are being exploited by the ready-worded writers. The term "sex hormones" represents an historical inaccuracy, which was quickly dropped by medical men, but is persistent in the lay mind. This group of substances, called steroid hormones by the chemist, contain among others two general categories of hormones. These are the estrogens, formerly called "female sex hormones," and androgens, once classified as "male sex hormones." This latter usage is repeated in the title of a new book. These estrogens and androgens are produced in the gonads, the ovaries and testes, and also elaborated by at least one other endocrine gland, the adrenal cortex.

The estrogens and androgens have considerable importance in causing the development of the secondary sex characters in girls and boys, respectively, at the beginning of adolescence. They are not sex specific, however, since both are present in varying amounts in both normal men and women. Paradoxically the stallion, one of the most "masculine" of animals, produces an extremely large quantity of estrogens, the hormones formerly called female sex hormones.

Another connotation which is erroneous is associated with the word "sex" hormones. Sex may mean maleness or femaleness, but to most people sex means just what the boys in the smoking room mean by sex. It is in the latter sense that the word sex hormone is inaccurate. Sexual behavior in the human is a complex, as everyone knows, composed of acquired behavior patterns and of a very large and important psychological component. To a degree the hormones play a necessary part, but only a part in the behavior pattern. The functions of these hormones are not restricted to sex or reproduction but also are important in other physiological phases of the bodily economy.

While these hormones have an important role in the development of the bloom of youth, they do so only within the limits of the inherited constitutional qualities and the nutritional state of the individual.

The actual clinical use of these hormones is limited. They are used as insulin is used in diabetes or as thyroid substance is used in hypothyroidism, that is, when there is definite evidence of a lack of the appropriate hormone.

Thus androgen may be used in young men who have lost both gonads by surgery or disease. In women, particularly those who have reached the menopause or "change of life," either estrogens or androgens are widely prescribed by physicians to aid the woman in making necessary physiological adjustments incident to the cessation of menstrual life. This treatment is frequently most necessary in women of the younger age groups who have lost the ovaries because of disease or tumorous growths. Estrogens are frequently used in older men who have a cancer of the prostate gland. In such a

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seriously malignant disease, either the removal of all source of androgen or the administration of estrogen causes some amelioration of the pain and other symptoms of the patient. Such treatment is palliative only; it does not "cure" the cancer.

When androgen is administered to older men with diminishing sexual activity, the effect gained is usually more psychological than physiological. In the minds of many physicians there is always the knowledge that cancer of the prostate, referred to above, is at least activated by this hormone.

Estrogens and other steroids are frequently used in attempts to correct disorders of menstruation, though without marked or uniform success.

Thus the only clinical indications for the use of these hormones is where a distinct lack of the particular hormone is shown.

The process of growing old, and the loss of vigor of men and women, is more complex than a decline in estrogenic or androgenic hormones. The elasticity of the arteries and of the skin changes after middle life. The tone of the muscles and recovery from fatigue changes with age. Experimental medicine is greatly concerned with these matters, and many experiments have been made in the use of androgens and estrogens. Some of the experiments have been carefully and precisely done, with constant checking with that god of the experimentalists, the control experiment. A most useful control in such experiments is in the elimination of the power of suggestion. While men may "feel lots better and peppier" when being given androgen treatment, they frequently show just as marked improvement when being given an inert and harmless substance. They are better merely because they believe and wish it so.

And the woman who won't admit to 50 years and invests in hormone preparations to avoid the wrinkled cheek is being not only deluded, but is dealing in self-medication with a drug which is potentially dangerous.

The man past 60 who hopes to restore his aging arteries and consummate the dreams of by-gone years by using the chemists' magic steroid hormones will be, at best, disillusioned.

Workers in experimental medicine are interested in these problems both for their theoretical and their practical value. When new methods are found for preventing undesirable features of growing old, the public will then be told authoritatively. Until then, we will continue the search instituted by Ponce de Leon for that limpid spring—but the source of that spring is not to be found in a bottle of hormone tablets at the corner drug store.

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MEDICINE

Still Have Jaundice

➤ ALTHOUGH the great majority of soldiers who suffered from jaundice in connection with vaccination against yellow fever have probably fully recovered, about 12% of them still have some evidence of the liver disease.

Detailed study of a group of 200 soldiers returned from overseas because they had failed to convalesce satisfactorily is reported in the *Journal of the American Medical Association* (June 2), by Col. Julien E. Benjamin and Major Ralph C. Hoyt, of the Medical Corps, Army of the United States.

"As a group, they were pale, thin, exhausted and utterly devoid of animation," these medical officers report. "Their reactions, mental and physical, were slow and indifferent."

Part of the group were found to be suffering from a neurosis. In many cases, the men had been neurotic before the attack of jaundice or even before induction, or they had had a latent neurosis which was aggravated or brought on by the illness and the long hospitalization.

This group was greatly benefited by a carefully planned program of rehabilitation. They were put into uniform, became once again part of the armed forces and spent a portion of each day at the sports arena indulging in graduated games and calisthenics.

However, 37 patients, 18.5% of the group studied, were extremely weak and exhausted, and suffered from nausea and vomiting brought on by the first bite of food or by walking even a short distance. Fingers and feet were icy cold, yet it was not unusual to see perspiration actually dripping from the tip of each finger. Even the effort of shaking hands would bring on a tremor of the hands.

The medical officers term the weakness of these men as "devastating and overwhelming."

"For example," they report, "it was impossible for many to complete the writing of a postcard without resting at least once, nor could they dress themselves without noticeable exhaustion."

This group of 37 patients showed but little improvement under rehabilitation. They failed to gain in weight, and sweating of hands and feet was still excessive. The tremor remained constant. There was, however, objective evidence of improvement in the liver functions and at the end of the period of observation, 23 had fully recovered in this respect.

Whether all will eventually recover completely, only further time will tell, the investigators conclude.

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ORNITHOLOGY

Hummingbirds Must Learn To Get Food from Flowers

➤ YOUNG hummingbirds apparently do not realize that honeysuckle, larkspur and bird-of-paradise blossoms offer an inviting source of food until at least two weeks after they have left the nest, Frank Bene of Phoenix, Ariz., reports in the *Condor*, a magazine of Western ornithology.

The earliest acts of the young birds which bear any semblance to feeding behavior, Mr. Bene finds, are extension and retraction of the tongue, and probing twigs and leaves with the bill, at first while perched on a twig and later while hovering about it on the wing.

Hummingbirds seem to recognize flowers as a source of food only after

NOT BY INSTINCT—This black-chinned hummingbird seemed to recognize the honeysuckle blossom as a source of food only after it had acquired sufficient strength for sustained flight. Photograph by Frank Bene.

they have acquired sufficient strength for sustained flight. Before that, even though an adult would probe a blossom only a few feet away, the fledglings still made no attempt to search the flowers.

Only upon tasting the food can they decide whether or not they want it. Most hummingbirds prefer syrup made with white sugar, provided the solution is not too dilute. Commercial honey ranks next, but instead of taking long drinks, the birds only sip the honey-and-water mixture. Brown-sugar syrup is least desired, and salt water refused.

Several nasturtium blossoms with some of the spurs clipped were placed by Mr. Bene over the mouths of small vials and one ounce wine glasses filled with honey or brown-sugar syrup. When the vials were hidden in the nasturtium beds so that the flower decoys could not be distinguished from genuine nasturtium blooms, the birds were surprised to discover the abundance of sweets they held. Thereafter these blossoms were sought in the nasturtium beds, the birds flying straight to the decoy.

A hummingbird can discriminate the color, taste and form of flowers, Mr. Bene believes, and through association learn to recognize and locate them.

Having once associated a place with a specific source of food, hummingbirds will return to the site although the food source has been removed. Apparently only one visit is enough for them to remember a place, a five-year-study of black-chinned hummingbirds showed.

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GENERAL SCIENCE

Soviet Science Celebration

A group of American scientists will attend the 220th anniversary of the Academy of Sciences of the U.S.S.R., June 15 to 28.

➤ A GROUP of American scientists will attend the 220th anniversary celebration of the Academy of Sciences of the Union of Soviet Socialist Republics to be held in Moscow and Leningrad, June 15 to 28.

Signalizing the return of scientific interchanges between the Soviet Union at peace and the United States, the visits of American scientists are expected to aid in the establishment of even closer relations in the coming months.

The American scientists will be the guests of the Soviet government and will fly to Moscow.

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Academy Celebration Includes Popular Festival

By IVAN KUZNETSOV

Soviet Scientist Antifascist Committee Writer

➤ The 220th anniversary celebration of the Soviet Academy of Sciences to be held late in June will, in addition to meetings, include a popular festival honoring the scientists of the U.S.S.R. and what they have done to serve their nation in peace and war.

The academy consists now of 145 academicians, including some of the leading figures in Soviet science, among them Dr. V. Komarov, botanist, who is president, Dr. P. Kapitsa, physicist, Dr. N. Semenov, chemist, Dr. I. Vinogradov, mathematician, Dr. I. Orbeli, physiologist, and Dr. N. Burdenko, surgeon.

Fifty-seven institutes or sections equivalent to institutes are operated by the Soviet Academy today, with a total staff of more than 5,000 scientific and technical workers. The work is divided into eight departments: Physics and mathematics, chemistry, geology and geography, biology, technology, history and philosophy, economics and law, literature and language.

The academy is the guiding body in all Soviet research work and it is a sort of general headquarters for science where fundamental problems are studied.

Differing from foreign scientific bodies in organization and work as well as size, the U.S.S.R. Academy of Sciences is directly responsible to the Council of the People's Commissars. It renders an annual account of its work to the Council. The chief function of the academy is to promote pure and applied science in the U.S.S.R. and to study and develop achievements in world science. A fundamental task given the academy is to "apply all scientific achievements to the work of building up a new socialist classless society."

The academy was founded in 1725 by Peter the Great and soon became Russia's authoritative scientific body. Most of the leading Russian scientists have been members, including Lomonosov, father of Russian science, the biologist Kovalevsky, the chemist Butlerov, the mathematicians Ostrogradsky, Chebyshev and Markov, and the physiologist Pavlov.

In 1725 the academy had 15 members and a hundred years later there were 22. In 1916, shortly before the revolution, there were 47 members and in 1925 when the 200th anniversary was celebrated there were 48 members.

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PUBLIC HEALTH

Suicide Rate in Germany Double What It Is in the U. S.

➤ IF MANY Nazi leaders killed themselves as some reports indicate, they followed a tendency that is much stronger in Europe than it is in the United States.

The suicide rate in Germany in 1936, the last year for which any reliable figures are available, was 28.6 per 100,000 population—just double the rate for the same year in the United States, 14.3.

The only European countries with suicide rates lower than that of the United States in that year were the Netherlands, with a rate of 8.1; England and Wales, 12.3; Romania, 10.5; Norway, 6.3; Eire, 3.3; and Italy, 7.9. It is believed that the low rate in Eire and Italy may be accounted for by the large Catholic population; the Catholic teachings are very strong with regard to suicide and burial in consecrated ground is refused to those who are known to have deliberately killed themselves.

If the effect of war is the same in Germany as it generally is in other countries, however, it is probable that the suicide rate is lower there now than it was in 1936. The first World War caused a drop in the German suicide rate. From a rate of 23.1 per 100,000 in 1913, it dropped to only 15.3 in 1918.

The U. S. suicide rate has dropped in the present war to 10.2 in 1943, the latest available Census Bureau figure.

Japan, contrary to popular belief due to the practice there of the traditional hara-kiri, has only a moderate suicide rate. In 1936, the rate was only 22.0 per 100,000. The rate in Austria was 40.2.

But even in countries where the suicide rate is highest, self-murder does not compare as a cause of death with the most serious diseases. The U. S. death rate from cancer in 1936 was 111.4.

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ENGINEERING

Better Sound for Movies

Is possible through loudspeaker systems that are more efficient, give better performance and eliminate rear radiation resulting in higher overall quality.

➤ NEW and improved sound for motion picture theaters is possible through loudspeaker systems that are more efficient, give better performance, and eliminate rear radiation from the speaker resulting in higher overall quality, J. B. Lansing and K. K. Hilliard, both of Altec Lansing Company, reported at the meeting of the Society of Motion Picture Engineers in Hollywood.

The loud speakers described employ new metal diaphragms and voice coils that are superior to those used in the past, and new Alnico Type 5 permanent magnet with magnetic circuits of very low leakage. The diaphragm and voice coil assembly is mounted in such a manner that it can be removed for replacement purposes without discharging the permanent magnet field, the authors stated.

Mr. Lansing also revealed details of a new duplex public address system for theaters that combines a low-frequency unit and a high-frequency unit into a single speaker with a total combined frequency range of from 40 to 15,000 cycles over a wide angle. The efficiency of this unit in converting electrical power into acoustic energy is very high and the unit is capable of producing high-quality sound at high power, he declared.

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Simpler Film Filing

➤ AMATEUR movie fans who have so many reels of film that the location of any one particular scene in a film presents a special problem may get a few good ideas from Carl M. Effinger, of 20th Century Fox Film Corporation, who reported to the meeting a new filing and cataloging system for motion picture films. The system, as described, replaces the card index system and is streamlined, simplified, and visual.

The secret of the system is a loose-leaf catalog. Each loose-leaf page is divided into seven sections with a hole, the shape and size of one frame of motion picture film, cut into the page at each section. It is a good deal like a snapshot album, with seven single frames and a description of each on a single page. Since amateurs use 16-millimeter film they could probably get more frames on one page than the movie studios, which use larger 35-millimeter film.

Only similar scenes appear on any given page, such as ships, excursion day, trains, streets, and so on. At the top of each page is an exact breakdown summary of the shots on the particular page, so that you can tell at a glance where the shots in a particular category are located.

Each item is keyed to a particular spool of film, so that the librarian can instantly locate the desired sequence. One of the most desirable features of the film catalog system is its compactness. Stored in two medium-size safes, 36 volumes catalog completely over 22,000,000 feet of film, he pointed out.

This same method was to have been adopted by the U. S. Government in cataloging war films in the United States War Film Index Library, Mr. Effinger stated.

Adapted to amateur use, it would make it possible for the movie fan to keep a complete record of all the pictures he has taken, and to locate quickly any desired shot, without having to run through hundreds of feet of film. Not only would this be helpful in editing his own home movies, but the film catalog makes an excellent album for recording a picture-taking career.

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FILING FILM—This new system makes it easier to locate any particular scene in a film. A loose-leaf catalog is used, with each page divided into seven sections. A hole, the size and shape of one frame of motion picture film is cut into the page at each section.

PUBLIC HEALTH

Predict TB Death Rate Will Be Halved in 1960

➤ ONLY about 20 people in every 100,000 in the United States will die from tuberculosis in 1960 if the present rate of improvement continues, statisticians of the Metropolitan Life Insurance Company estimate.

At present about 40 in every 100,000 die from tuberculosis, while in 1921 about 100 per 100,000 died from this disease which caused the death of almost 200 in every 100,000 at the beginning of the century, according to the U. S. Bureau of the Census.

For more than four decades the mortality from tuberculosis in our country has been sweeping downward without interruption. The current death rate from the disease is only about one-fifth what it was in 1900.

From 1921 through 1943 the death rate decreased on an average by 4% annually. This means that the absolute annual decline was less each year, but it should be remembered that as room for improvement diminishes, it becomes increasingly difficult to make further gains.

We may expect a death rate of only about 30 persons each 100,000 in 1950 if the decline in deaths from this cause continues at the same rate as in the period from 1921 to 1943, the company statisticians state. They believe, however, that the actual figures may be even lower than those indicated by the forecast.

An important step toward combatting this disease was the establishment, last July, of the Tuberculosis Control Division in the U. S. Public Health Service, whose function is to develop, on a nationwide scale, more effective measures for the prevention, treatment and control of the disease.

The new program will give added impetus to the widespread use of X-ray mobile units for mass surveys, an incidental advantage of which will probably be the discovery of other diseases.

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ORNITHOLOGY

Grasshopper Sparrow Is Little Known Bird

See Front Cover

➤ THE TINY grasshopper sparrow, like the one on the front cover of this SCIENCE NEWS LETTER, is one of the commonest sparrows in the eastern part of the United States, yet it is one of the least known because of its seclusive habits and its thin, insect-like song. Its high-pitched song of "zee-e-e-e-e-e-e" can be heard for only a distance of several hundred feet. This song gives rise to the name of grasshopper sparrow.

It lives in old dry grassy fields and will not take wing until almost stepped upon. When it does fly, it seldom rises higher than a few feet above the ground. Its favorite singing perch is on a fence rail. Its nest is rarely found because it is cleverly concealed under the grass. The bird avoids giving a clue to the location of its nest by entering the area through a long and devious pathway in the grass.

The unusual photograph on the cover was taken by George A. Smith of Quarryville, Pa., by synchronized flash, and by remote control with a miniature camera placed within two feet of the nest.

Science News Letter, June 9, 1945

PHYSICS

Fiberglas Mats Valuable In Several Applications

➤ FIBERGLAS mats, developed originally for use in storage batteries, are now found to be valuable in several other applications. They are employed with success for wrapping underground oil, gas, and other pipe lines to protect them against electrolytic action and corrosion; as a base for a new plastic laminated material; and as a base material for gaskets and sheet packing. These mats are made by the Owens-Corning Fiberglas Corporation.

Glass fibers are non-corrosive to metals and have negligible moisture pickup. The mats of this material can be wrapped around bitumen or coal tar-coated pipe, thus forming a continuous water-tight bond. The tensile strength of the material withstands a wide range of temperatures, and exposure to organic solvents and soil acids.

The new plastic laminated material in which "fiberglas" is used, has many electrical uses because it possesses a low and stable loss factor over a wide wave frequency range. It is employed in plastic coil forms, condenser spacers, stand-off insulators, and in radio, television and other high-frequency electronic devices.

In the base material for gaskets and sheet packing, the mat acts as a carrying medium for synthetic resins suitable for applications requiring resistance to heat, oil and acids. The gaskets show high pressure resistance, chemical durability and little flow under flange pressure.

Science News Letter, June 9, 1945

MINERALOGY

Industrial Diamonds Cut With Electric Arc

➤ CUTTING industrial diamonds with an electric arc, a new process just discovered at the National Bureau of Standards, increases the rate of cutting from double to four times that of present methods. The discovery is perhaps the greatest real advance in the technique of cutting diamonds since the art was first practiced hundreds of years ago.

Two scientists of the Bureau are responsible for the new method, C. G. Peters and Karl F. Nefflen. They find that they are able, with the electric arc method, to double the cutting rate when the cut is in the most favorable direction as regards the crystal axis, and to increase the rate about four times for the least favorable direction.

The electric arc is formed between the diamond and the cutting lap. Messrs. Peters and Nefflen connect the secondary terminals of a 5000-volt power transformer to the dop that holds the diamond and to the rotating lap. When an alternating current of 110 volts is applied to the primary of the transformer and the current adjusted to about half an ampere, a small blue arc is formed at the contact of the diamond and lap.

They have also found that by applying the arc to a diamond saw, the sawing rate is greatly increased, so that diamonds can be sawed regardless of the orientation of the cut with reference to the crystal axes.

The method for cutting plane surfaces or facets on diamonds, used universally since the earliest records, has been to place the stone in contact with a flat cast-iron lap charged with diamond powder and rotated at about 2000 revolutions per minute. As a general rule, cutting is most rapid when the plane of the facet is parallel to one or two of the crystal axes of the diamond and the direction of motion of the lap surface is parallel to one of the axes.

Science News Letter, June 9, 1945

IN SCIEN

ORNITHOLOGY

Bright-Plumaged Birds Sent from Costa Rica

➤ THE NATIONAL Zoological Park in Washington has a good neighbor far off to the south, in the Central American republic of Costa Rica. He is Alejandro Caballero Gamboa, of San Jose, who has sent half-a-dozen of the brightest-plumaged birds ever received in the capital. The collection consists of one honey-creeper, a pair of blue-hooded euphonias, and two Costa Rican chlorophonias, and one bird as yet unidentified. Luis Maiden, a geographer now conducting field studies in Central America, acted as intermediary in transmitting the birds.

The National Zoo is also rejoicing in additions to two native North American families. There are two new cubs in the mountain lion's den, and two in the cage of the red fox.

Science News Letter, June 9, 1945

HORTICULTURE

Cornell Has Roses With Stems 20 Inches Long

➤ ROSES are sold by stem length—the longer the stems, the higher the price.

On this basis, Cornell University probably has the most expensive roses being grown, for the average stem length is 20 inches, as compared with 12 to 15 inches in the commercial trade.

The Cornell specimens also have from 35 to 40 flowers per plant, whereas commercial production averages less than 30 flowers per plant.

The reason lies in better fertilizer concentrations and close attention to watering. A higher soil moisture content is carried, for example, than in most commercial production.

The rose plants are grown in benches. No fertilizer is lost. Water that leaches from the soil is caught in the crocks and returned to the soil in the next watering. Thus the soil nutrients are saved and used again.

Many experiments on rose growing are underway in the floriculture department's greenhouses—on soil moisture, watering both by hand and by automatic methods, and nitrate studies.

Science News Letter, June 9, 1945

E FIELDS

CHEMISTRY

Fuel Substitute Is Better Than Gasoline

➤ A NEW fuel substitute for gasoline that gives one-fourth more power in a properly designed internal-combustion engine is reported by Donald B. Brooks of the National Bureau of Standards. A blend of certain non-hydrocarbons, the fuel, if used in an ordinary gasoline engine may give up to 5% more power than gasoline, he stated.

The components of the new blend are ethyl alcohol, diethyl ether, acetone and butanol. These can also be used "straight" in some cases, Mr. Brooks stated. His conclusions are based upon tests of substitute motor fuels conducted in a precision single-cylinder variable compression engine in the Bureau's automotive laboratory at the request of the Foreign Economic Administration of the Office for Emergency Management.

Science News Letter, June 9, 1945

PSYCHOLOGY

Average Newborn Baby Cries 113 Minutes a Day

➤ THE AVERAGE newborn baby cries for 113 minutes a day.

This, according to an editorial comment in the *Journal of the American Medical Association* (June 2), "is more than should be necessary for the normal use of the cry as a signal of need."

The baby bawling was clocked in the nursery of a maternity ward by Dr. C. Anderson Aldrich of the Mayo Clinic and his associates.

The calmest hour of the nursery day, they found, is at 10 a.m.—a time when the nursery is fully staffed, the babies fully fed, and "the smaller needs of the infants were more completely satisfied."

The noisiest time comes between 10 p.m. and 2 a.m.—when there were only two student nurses to take care of 30 babies.

From this and other data on crying the physicians conclude that hospital routine and the distribution of nurses through day and night should be adjusted to the community needs of the infants.

Despite the offhand impression of parents of twins, it was found that crying does not seem to be contagious from one baby to another.

"The chances are less than 0.14%," the doctors figure, "that more than half of the babies in the nursery will be crying simultaneously."

Science News Letter, June 9, 1945

HOME ECONOMICS

Cake Crumbs, Dried Fruit Make Sugar Go Farther

➤ CAKE CRUMBS and dried fruits can be used to make sugar supplies go farther. Honey, molasses, corn or maple sirup may be used instead of sugar in baking.

Extra juice saved from canned or cooked fruit may be used in sauce for puddings and fritters; to moisten and sweeten crumbs for brown betty and sweeten and add flavor to gelatin desserts, point out food specialists of the War Food Administration.

Crumbs saved from cake and cookies cut in half the amount of sugar needed for bread puddings.

Marmalade, jam or preserves spread on warm cake make an excellent substitute for cake frostings and fillings, which call for considerable sugar. Sheet cakes require only half as much frosting as layer cakes.

Fillings for pies, turnovers and tarts can be made with steamed dried fruit, rich in natural sugar. A good filling for layer cake is made of chopped dried fruit, mixed with nuts and moistened with honey or corn sirup. Fill baked apples or pears with raisins and sirup or honey instead of using sugar.

Fresh fruits should be served as dessert frequently, especially during the summer months. Fruit salad may also replace a sugar-consuming dessert.

A bit of salt, added to the cake frosting, pie filling or pudding, accentuates the sweetness. Less sugar is needed to sweeten cooked fruit if it is added after instead of before cooking.

Cornstarch or tapioca cream pudding may be made with half the usual measure of sugar if a tablespoon of sirup is put in the bottom of each serving dish before filling with pudding.

These hints will be especially helpful in feeding crowds at community picnics and large suppers this summer. Assembled by industrial feeding specialists of the War Food Administration for the use of chefs and dietitians in restaurants, cafeterias and hospitals, they will help your own sugar supplies last longer.

Science News Letter, June 9, 1945

ENGINEERING

Norden Bombsight Is Really Master Robot

➤ LONG one of the major secrets of World War II, the Norden bombsight is disclosed as a complex mechanism that rapidly shows the bombardier where and when to drop his bombs. In its operation it solves two problems in trigonometry, makes other mathematical computations, and finally takes over the job of the pilot on the bombing run.

The essential parts of the Norden sight are a gyro-stabilizer, computing machinery, and an optical system in which is installed a mirror attached to a variable speed motor.

In operation, the bombsight measures the rate of change between two imaginary lines, one of these lines is the equivalent of a plumb line hung from the plane. The other is the constant line of sight to the target, maintained by the mirror. The angle at which this mirror is tilted changes as the plane approaches the target.

By viewing the target through the sight, then setting the knobs which control the computing mechanism and switching on the automatic pilot, the bombardier is ready to drop his bombs. He does not necessarily have to keep his eye on the target once this is done, for a pointer, mounted on the sight, shows him the exact moment when he should drop his packages of destruction.

Science News Letter, June 9, 1945

INVENTION

Fire-Alarm System for Airplanes Insures Safety

➤ GREATER safety for air travellers of the future is sought in a new fire-alarm system, on which U. S. patent 2,376,920 has been issued to Harry S. Jones of East Orange, N. J. Rights in the patent are assigned to Thomas A. Edison, Inc.

Since any fire-alarm system intended for use on planes must endure a good deal of buffeting and exposure, the basic design must be simple. Mr. Jones' device meets this requirement; its basis is the well-known principle of the thermocouple, in which a pair of unlike metal pieces have their electrical properties changed by heat. A ring of thermocouples, connected by a cable, is secured to the firewall directly behind the engine. If a fire occurs, the current within this ring, stepped up through a relay, sounds the alarm.

Science News Letter, June 9, 1945

ENGINEERING

Sound on the Record

New and improved methods, developed in recent years, will mean better recordings for longer periods of time and at lower cost after the war.

By ROBERT N. FARR

➤ RECORDING sound by new and improved methods, developed since the industry began to expand in recent years, will mean better recordings, for longer periods of time and at lower cost after the war.

Generally speaking, today's recording devices fall into three groups; those that record mechanically, like a phonograph record; those that record magnetically, like the magnetic wire recorder; and those that record photographically, like sound movies. Probably the most faithful reproduction of sound can be secured by the photographic method, since there is no mechanical distortion, but other types of equipment are being studied and improved, so that soon they may be equal to or better than photographic recording.

What are these new recording devices? How do they work? Will they play an important part in postwar business and entertainment? Well, here are some of the answers.

Those small, compact units which record on spools of cellulose tape, movie film or wire, are the latest developments in recording equipment. You can record voice, music, or any other sound for several hours with almost any of these devices at a cost of a few cents an hour. They are an improvement over recording on phonograph discs which limit recording time to 15 minutes or less, depending upon the diameter of the disc used.

One of these devices, the so-called "continuous sound recorder," records on either cellulose acetate or ethyl cellulose tape, the width of 8, 16, or 35 millimeter movie film. One to five hours of recording is possible with film recorders which emboss, side by side, as many as 15 sound tracks on the entire length of the film.

High Speeds

Using various types of microphones, sounds are picked up and converted to mechanical pulsations which cause a jewel needle to vibrate on the surface of the film which moves at speeds of 40, 60, or 90 feet a minute, leaving an embossed record of the sound in the film strip. High speed is necessary so that all tone variations will be recorded. By re-winding the film, which is spooled on reels like movie film, the sound can be reproduced through an amplifier, using a magnetic pickup fitted with a jeweled stylus similar to that found on the best electric phonographs.

Jewel-tipped needles are used because jewels such as diamonds, sapphires, and rubies are harder than steel and resist wear over a longer period of use. When a needle becomes worn, it develops ridges in its outer surface which leave an imperfect record of sound on the film or disc, and cause mechanical surface noise when the recording is played back.

Record Any Sounds

One continuous cellulose tape recorder now in wide use with the armed forces and by the government was developed by William Wolf and is called the Recordgraph. Another similar device was invented by J. C. Fonda, ex-Hollywood cameraman. Mounted in a single case, containing both recording and reproducing equipment, the units weigh less than 50 pounds. They can be used to record any sounds, operating on 110 volt, 60 cycle alternating current, or with adapters, any other type of current.

The Recordgraph, which embosses sound on film with a sapphire-tipped needle, was used to record a report of the Normandy Invasion and the first B-29 raid over Tokyo. These recordings were broadcast over the entire world.

You can start the Recordgraph by turning on the current and speaking into the microphone. An automatic switch starts the machine when sound begins to come over the microphone, and stops the recording when the sound stops. With this device it is possible to record under conditions of extreme vibration, and you can record with the machine in an upside-down position. A new-type volume control automatically prevents booming sounds, such as roaring gunfire or the zoom of planes, from drowning out other sounds. This is accomplished by compressing loud sounds with an electronic amplifier.

Still another similar recorder is known commercially as Millitape. A coating of black gelatin is put on standard eight-millimeter film, making it opaque. Millitape uses a sharp pointed recording needle which cuts through the coating, leaving a transparent sound track where the needle has passed. The recorded sound is reproduced by running the film between a beam of light and a photoelectric cell which converts the visible sound track into electric impulses, which are in turn amplified and reproduced through a loud speaker.

Recording on film by the mechanical methods described above is probably the most economical way to permit you to make permanent recordings that can be played back immediately. The big disadvantage is that duplicate copies cannot be made without re-recording on new tape, using the original film as a source of sound. Re-recording devices are expensive, costing from $600 to $1,500, yet, even at such high cost, they are less expensive than many other types of recording devices that give comparable quality of sound recording and reproduction.

USES WIRE—This portable pocket model of the magnetic recorder can be carried around with you to keep a permanent record of interviews, important events and even concerts.

RECORDS HISTORY—Important events are recorded vividly in the words of the men who make them by a cellulose tape recording device. One of many kinds of recorders to be available after the war, this instrument can record up to five hours without stopping on 35 millimeter film.

Probably the most recent development in recording is the magnetic recording of sound on a spool of steel wire 0.003-inch thick, almost as fine as a human hair. The idea was based upon the invention of a Danish professor, Valdemar Poulsen, in the late 19th century, and has only recently been perfected and produced commercially.

The wire is drawn at a speed of 1.25 feet a second past the iron cores of a set of coils, and speech or sound current, passed on from the microphone, is converted into a magnetic pattern on the wire. When the wire is drawn past a set of reproducing coils, current induced by the magnetic pattern is picked up by the coils and converted into sound through an amplifier and loud speaker.

Sound can be wiped off the wire, so that it can be re-used almost indefinitely, by passing it through a magnetic field that neutralizes the magnetic pattern. Any part of the wire can be erased without harm to the sound recorded on adjacent parts. If the wire breaks, it can be "welded" together by tying the two ends and applying the heat of a cigarette.

The wire is unaffected, so far as sound is concerned, by temperatures and humidity conditions that might ruin cellulose tape or film. The unit is comparatively unaffected by external vibration and severe shock.

The unit is small, compact, and expensive. Some 15 commercial firms, including Armour Institute, General Electric, Stromberg Carlson, and Raytheon are experimenting with postwar applications of the device. One version is a three-pound battery-operated recording unit in a plastic case that can be carried around like a small camera. Using a lapel or hand-held microphone, up to one hour can be recorded on the 1,720 feet of wire on a reel in the unit. An automatic device prohibits further recording when the end of a spool is reached. Another magnetic wire recorder, called Soundex, employs two darning needles as the magnetic poles for setting up the sound pattern on the wire.

The main problem today with the magnetic wire recorder is that the wire has to move at a speed of about 225 feet a minute to pick up sound so that faith-

ETHER AND MATTER

by C. F. Krafft

The above book of about 160 pages with 50 diagrams and 6 tables is now with the printer, and will be released for one dollar a copy (the actual cost of printing) as soon as the copies are obtained from the printer. In the meantime the writer's earlier publications ("Essays on the New Vortex Atom") may still be obtained free of charge.

C. F. Krafft

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Do You Know?

There are 1,200 military uses for *lumber*, it is estimated.

Oklahoma leads the United States in the production of broomcorn.

Alcohol is being made from waste and surplus bananas in Jamaica.

Chemotherapy, the internal treatment with chemicals, is being used to combat Dutch elm disease in Connecticut.

Fifty different *enzymes*, all proteins, are known to be present in skeletal muscle.

The catch of *lobsters* on the coast of Maine last year was 14,500,000 pounds, the largest since 1892.

Turkey hens normally produce from 40 to 60 eggs during the spring months, and few if any during the other months.

TEACH SCIENCE AND SEE THE WORLD

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ful reproduction will result. At present the wire moves at a speed of 75 feet a minute. At the higher speed for good recording, you would need 9,000 feet of wire for 40 minutes of sound. Even with very thin wire, such lengths make the spools bulky, and the cost of Swedish steel wire, needed for best results, is high.

The motion picture industry uses either the RCA Photophone or the Western Electric systems to record sound on film. These processes are entirely photographic and eliminate mechanical distortion caused by needles and surface noise.

A beam of light, passing through a slit made by two pieces of metal which vary in width depending upon the sound picked up by the microphone, flashes upon the film "dashes" of varying width. This is the Western Electric variable density method of recording sound photographically.

Variable Area System

The other method is called the variable area system, and is used by RCA Photophone. In this case the intensity of the beam of light, projected on an oscillating mirror, throws a solid blot of light on the film which varies in area depending on the sound current from the microphone.

In the sound motion picture projector, when the sound track printed beside the pictures is passed between a beam of light and the photoelectric cell, the variations in area or density are converted into electrical impulses which in turn create sound waves in loud speakers mounted behind the screen.

The photographic method of sound reproduction is not suitable for immediate play-back, since the film must be developed and printed like motion pictures before it can be reproduced.

Recording sound was done by Edison in 1876 on a cylinder, but the modern disc or platter was the idea of Emile Berliner. Today, about 90% of the recording done is on these record discs similar in shape to the phonograph records that you buy at music shops. The discs themselves are made of cellulose acetate or vinylite resin spread thinly over a disc of glass, aluminum alloy, or paper composition.

Aluminum alloy discs are also used for recording without any coating. Very sharp steel alloy or jewel-tipped needles cut into the surface of these records at recording, leaving a spiral sound track. Since they require no processing, disc recordings can be played back immediately.

Modern recording equipment for "canning" sound on discs consists of a turntable like that on a phonograph, a recording needle mounted in a "recording head" and a pickup for playing back the recording. The recording head is connected to the microphone through an audio frequency channel, while the pickup is connected to a loudspeaker through an amplifier. The records you play on your home phonograph are usually 10 or 12 inches in diameter and run at a speed of 70 revolutions a minute.

There are two ways of cutting a sound track on a disc record, lateral or vertical. The vertical method was employed by Thomas Edison in the first recording machine which he built. The indentations of the cutting needle are impressed on the floor of a groove in the record so that the sound track resembles a continuous stretch of hills and valleys caused by varying impressions of the needle on the acetate.

The early disadvantage of vertical recording was that in playing back the record, the pickup needle would jump from the top of one hill to the crest of the next, skipping the valley. Recently, however, Western Electric has overcome this by suspending the playback needle arm so that the needle itself carries no weight, and follows the true pattern of the groove.

Emile Berliner developed the lateral method of recording. By his method the needle cuts into the side walls of the sound track so that *(Turn to page 366)*

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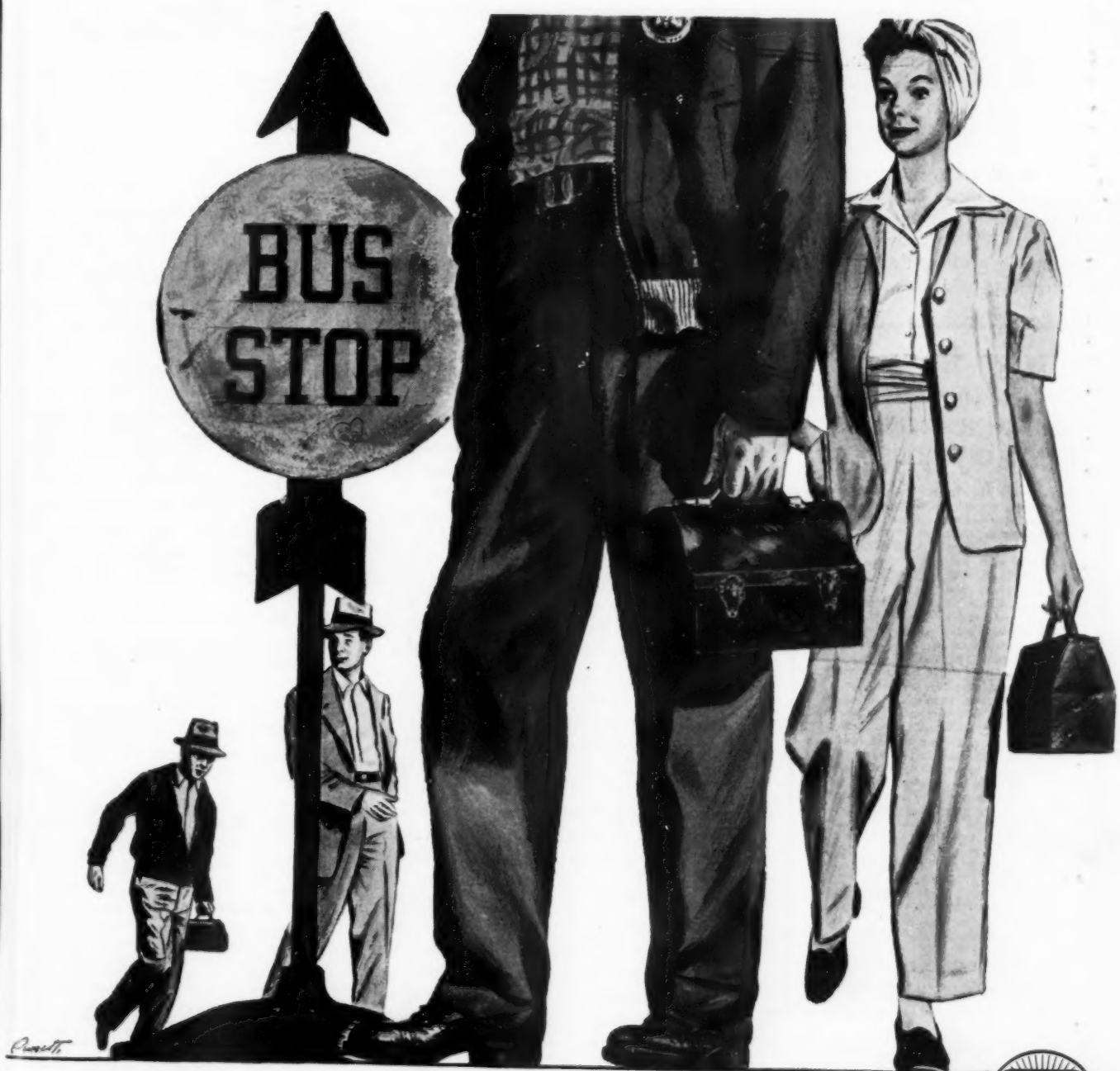
THE BUS HAS HELPED TO PUT THE MAN IN MANPOWER

A MAN doesn't become manpower until he punches in at the factory gate. Today it doesn't matter much whether he lives one mile from the plant or thirty miles away—as long as there is a bus at hand to take him to work.

The nation's bus industry is bringing manpower to vital war plants from miles around—transporting millions of war workers in safety, day and night, rain or shine.

The bus industry can indeed be proud of its wartime record in carrying tremendously increased numbers of passengers in spite of shortages of equipment, parts and skilled help.

The war has brought home how important a part gasoline plays in the transportation system of this nation. We, of Ethyl, are glad to have been able to contribute to the improvement of engines and fuels and look forward to continuing cooperation with both manufacturers and operators in the future.



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From Page 364

instead of a vertical movement, the needle moves from side to side. On this type of record, microscopic examination shows that there are no hills and valleys as in the vertical record. All recording equipment in use today, except that made by Western Electric and Fairchild, uses lateral recording. Both types of recordings can be played back on any good reproducing machine.

Professional disc recorders are produced by Presto, Fairchild, and Speak-O-Phone and others in portable units mounted in suitcases. Many manufacturers, including RCA, Scully, and Presto make professional studio equipment for stationary permanent installation. Home recording devices are manufactured by Wilcox-Gay, RCA, Emerson and others.

One of the latest developments in disc recording and reproducing is a sound pickup device for playing back recordings that rides in the groove of the record, eliminating entirely the pickup arm which heretofore held the needle. It consists of an L-shaped metal weight with a felt pad to protect the record on one branch of the L, and the needle with an electrostatic pickup on the other branch. Wires run from the device to the detector and amplifier. In operation, the device is set in the outside groove of the record by hand and, riding the groove, it travels the spiral path toward the center of the record. Supported only by the record itself, it picks up mechanical impulses as it moves along, which it converts into electrical impulses and then to sound.

Another new device is the Soundscriber, designed for office use. Employing an eight-inch vinylite resin disc, it will record up to 30 minutes of voice at slow speed. It can be used to record dictation, important telephone conversations or conferences. The records are small and unbreakable, so that they may be conveniently filed in a correspondence file for further reference. The big disadvantage of this otherwise handy device is that it records so many sound tracks so close together on the small disc that while the words are understandable, the voices do not bear much resemblance to those of the speakers.

One of the most recent combination recording devices, called "Radiotone" commercially, has been developed for the use of schools, industrial plants and institutions. This unit combines a radio, recording device of the professional type, and a public address system. Built by the Robinson-Houchin Optical Company, it may be used to record programs off the air from its built-in radio, from the public address system, or in the regular manner.

A fourth development, recently patented, is a recording device that will answer your telephone while you are away from home, record any message that the caller leaves, and play to the caller a recording of any message you wish to leave for him. It consists of two or more turntables mounted close together. Any turntable may be used for recording or reproducing. When your telephone rings, the vibrations of the bell actuate a detector which connects the telephone to the apparatus. The reproducing pickup is lowered to the record you have recorded and your message is played for the caller. Then a gong rings, and the caller is instructed to begin giving the message he wishes to leave for you.

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BOTANY

NATURE RAMBLINGS
by Frank Thone

Thorns and Thistles

➤ WEEDS have been recognized as the gardener's worst enemies ever since the first garden was dug. "Thorns also and thistles shall it bring forth to thee," was the heart of the curse imposed on Adam; cause enough that he should eat bread only "in the sweat of his face." And no gardener since that luckless arch-ancestor has been able to evade the burden of hoeing or pulling up weeds.

Wherever man has gone, his weeds have gone with him. We know little enough about the origin of our field and garden plants; most of them came into cultivation before the beginning of written history, so that records are in the very unsatisfactory state of having no beginning. And, naturally enough, we know even less about those illegitimate waifs, the weeds, than we do about the more favored children of our gardens.

We have been able, though, to get some idea of how adept weeds are at stealing rides into new territory from the way they travelled into the New World when our European ancestors came over here. They brought with them a large proportion of our common garden and field crops: lettuce and rad-

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

WYOMING

A Summer to remember

The 900-acre Paton Ranch will give you trout-fishing in a mountain stream in the foothills of the Big Horn mountains, daily horseback rides along picturesque canyon trails and excellent food—most of which is grown on the ranch.

The region abounds in geological and historical interest—dinosaur bones, marine fossils and implements used by the Indians many years ago.

Write for illustrated, descriptive folder

PATON RANCH, SHELL, WYOMING

ishes, peas and carrots, wheat and oats and rye, all came along with the white settlers; and so did pigweed and purslane, thistle and dandelion, velvet-leaf and jimsonweed and wild mustard, and others whose name is legion.

They arrived in all sorts of ways. Many, we may be sure, smuggled themselves in with supplies of garden and field seeds. Seed inspection, to keep such contaminants out of commercial seed supplies, has become a major function of federal and state agricultural departments, and despite the best efforts of the inspectors a certain small percentage of weed seeds still get by. Others probably came in ship-borne supplies of hay and straw used as feed and bedding for animals in transit. Still other weeds undoubtedly got their start on our shores when sailing ships dumped out the dirt and stones they carried in their holds as ballast.

A few weeds are plants that were brought in purposely and have since run wild—after the manner of the English sparrow and the starling. Such was the history of hemp, for example, brought in as foundation for a cordage industry that languished and died with the passing of sailing ships. Such also was the story of the teazle, whose prickly pods were once a necessary adjunct of the cloth-fulling industry. Some were originally ornamental plants, like the Australian saltbush on the West Coast and the Japanese honeysuckle along the Eastern seaboard.

But however they got here, and however little we want them now, they are here, and here they apparently are going to stay.

Science News Letter, June 9, 1945

Just Off the Press

COASTS, WAVES AND WEATHER FOR NAVIGATORS—John Q. Stewart—*Ginn,* 348 p., illus., $3.75.

HOW TO SOLVE IT, A New Aspect of Mathematical Method—G. Polya—*Princeton Univ. Press,* illus., 204 p., $2.50.

HISTORY OF PHOTOGRAPHY—Josef Maria Eder—*Columbia Univ. Press,* 860 p., illus., $10.

INFRARED AND RAMAN SPECTRA OF POLYATOMIC MOLECULES—Gerhard Herzberg—*Van Nostrand,* 632 p., illus., $9.50.

INTRODUCTION TO MEDICAL SCIENCE—Lulli Lindh Muller and Dorothy E. Dawes—*Saunders,* illus., 454 p., $3.

JOB PLACEMENT REFERENCE, With Introduction to the Job Placement Technique—Keith Van Allyn—*National Institute of Vocational Research,* 356 p., $10.

MAN AND HIS FOOD—Labor's Committee on Food and Nutrition, cooperating with War Food Administration, paper, 8 p., Free.

A MANUAL OF TROPICAL MEDICINE, Prepared Under the Auspices of the Division of Medical Sciences of the National Research Council—Thomas T. Mackie and others—*Saunders,* illus., 727 p., $6.

MEN AT WORK, Some Democratic Methods for the Power Age—Stuart Chase—*Harcourt,* 146 p., $2.

PRACTICAL PATENT PROCEDURE—Lucy Brett Andrews—*Lucy Brett Andrews,* paper, 32 p., $1.

YOUR HAIR AND ITS CARE—Oscar L. Levin and Howard T. Behrman—*Emerson,* 184 p., $2.

YOUR VOICE, Applied Science of Vocal Art—Douglas Stanley, *Pitman,* 306 p., illus., $4.50.

VEGETABLE DYES, from North American Plants, Douglas Leechman—*Webb,* 55 p., $1.25.

Science News Letter, June 9, 1945

America leads the world in the production of *optical instruments* both in quantity and quality; prior to World War I many optical instruments for America were obtained from Germany, the war gave a great boost to the home industry.

ANNOUNCEMENT

WE are proud to announce that the Spencer Lens Company will operate under the name of its parent company after June 30, 1945.

Please change your records to show our new name:

AMERICAN OPTICAL COMPANY
Scientific Instrument Division
Buffalo 11, New York

The name SPENCER, as in the past, will be a hallmark appearing only on the finest scientific instruments.

Since 1935, when the Spencer Lens Company was purchased by the American Optical Company, facilities for research and manufacturing have been greatly increased.

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Spencer Lens Company
BUFFALO 11, NEW YORK
Scientific Instrument Division of
AMERICAN OPTICAL COMPANY

•New Machines and Gadgets•

❁ *FRUIT BAGGER and weigher is an incline down which the fruit rolls into a bag suspended on one end of a balance beam with any desired weight on the other end. When the bag and contents reach the proper weight, the balance is upset and a gate automatically stops the rolling fruit.*

Science News Letter, June 9, 1945

❁ *SHOE PROTECTOR, to shield a worker's boot when handling oil, is a simple cover for the upper part of the shoe, made of an oil repellent material. Hinged narrow strips at the top are tucked inside the shoe to hold the cover in place.*

Science News Letter, June 9, 1945

❁ *CONSTRUCTION LEVEL, for use where pipes or other parts must be laid at a slight angle with the horizontal, is like the ordinary carpenter's level but has an insert in the base, hinged at one end, that can be opened out to any desired small angle by turning a screw.*

Science News Letter, June 9, 1945

❁ *WEED PULLER and cultivator is a hand garden tool with an S-shaped narrow blade at its end. The blade ends in two prongs that can be used to grasp the weed under the surface and pry it out. When turned over, the prongs may be used to scratch the soil.*

Science News Letter, June 9, 1945

❁ *LITTLE GIANT television tubes, for large-screen home television, are five inches in diameter, less than half the 12-inch prewar tubes on the face of which the picture was read directly. The new tube, shown above, gives a brighter picture and is cheaper to make.*

Science News Letter, June 9, 1945

❁ *SALT-AND-PEPPER shaker, to deliver a measured amount of either or a mixture of both, has two lateral containers and a tube leading from a cup-shaped top to a perforated base. When inverted, valves control the flow of the condiments to the transparent top, from which they pass through the tube when the shaker is placed upright.*

Science News Letter, June 9, 1945

❁ *BABY CARRIAGE, convertible into a swing, has two arms on each side projecting upward from the axles and hinged at the top. From the same joint other arms extend to the chassis. To convert, front and rear wheels are spread apart, releasing the chassis which is then free to swing.*

Science News Letter, June 9, 1945

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 262.*

BOOKS

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